

## SEMESTER –I

### Paper -1.1 Food Chemistry

(Credit: 4)

Hours: 60

Marks: 50

#### Group A

1. **Food chemistry:** Introduction, general definition and importance.
2. Water in food, water activity and shelf life of food.
3. Basic Stereochemistry, Symmetry element and Symmetry operation, concept of configuration and conformation, DL & RS nomenclature, conformation of cyclic molecule, anomeric effect.
4. **Carbohydrates:** Introduction, definition, nomenclature, classification, Stereo chemistry general properties of sugar. Identification of common mono, di and polysaccharides. Determination of reducing and non reducing sugars. Chemistry of starch, glycogen, cellulose gums and mucilage, crude fibre. Physiological functions of carbohydrate. Functional properties of sugars and polysaccharides in food.

#### Group B

5. **Lipids:** Classification, physical and chemical properties of lipid, soap and fatty acid detergents, essential, fatty acids, fats and oil, saponification value ,acid value, iodine value, acetyl value. Reichert Meissal number, oxidative and hydrolytic rancidity, phosphoglycerides, sphingolipids, nonsaponifiable lipids, cholesterol, prostaglandin.
6. **Proteins and Amino acids:** Physical and chemical properties of amino acid and protein. Structure and conformation of protein. Distribution, amount and functions of protein in food. functional properties , effect of processing.

### **Group C**

7. **Instrumentation:** Principles and application of Spectroscopy Lambert Beer Law, Extinction coefficient, UV, Visible and IR absorption Spectrophotometer.
8. **Principle of Microscopy:** and various kinds of Microscope. (SEM & TEM)
9. **Physicochemical Techniques:** Microspectrophotometry of cells and tissues, Fluorescence activated cell sorter, Techniques for purifying and characterizing Proteins and Enzymes.

### **PAPER -1.2 Biochemistry I (Credit: 4)**

Hours: 60

Marks: 50

### **Group A**

1. **Enzymes:** Classification, specificity, mechanism of action, kinetics, factors affecting enzyme activity, enzyme inhibition, coenzymes in metabolism, isozymes, enzymes in clinical diagnosis.
2. **Lipid Metabolism:** - Regulation of oxidation and biosynthesis of fatty acids. Metabolism of triglycerols, cholesterol, phospholipids, lipoproteins and eicosanoids (in brief). Inborn errors of lipid metabolism including hyperlipoproteinemias and ketosis.

### **Group B**

3. **Carbohydrate Metabolism:** - Regulation and hormonal control of carbohydrate metabolism including Glycolysis, TCA cycle, gluconeogenesis, glycogenesis, glycogenolysis, HMP pathway. Glucose transporters. Inborn errors of Metabolism.
4. **Integration of Metabolic Pathways**

## **Group C**

- 5. Amino acid Metabolism:-** Transamination, deamination, transmethylation, decarboxylation, glucogenic and ketogenic amino acids, metabolism of lysine, phenylalanine, valine, glutamic acid, urea cycle, synthesis of serotonin, histamine, dopamine, GABA (brief overview). Inborn errors of amino acid metabolism.
- 6. Nucleotide Metabolism:-** Characteristics, structure, classification, properties, metabolism, synthesis & breakdown of purines and pyrimidines (overview). Comparison of de novo and salvage pathways.

### **PAPER 1.3 APPLIED PHYSIOLOGY Credit: 5**

Hours: 75

Marks: 50

## **Group A**

- 1. Cell Physiology:** Membrane structure, fluid mosaic model of random diffusion of membrane component, Transport of nutrients. Active and passive transport mechanisms, compartmentalization of cells, transport of protein from the ER through the golgi apparatus. General strategies of the cell cycle. Cell communication: hormones and receptors, second messenger.
- 2. Endocrinology:** Introduction to mechanism of action of steroid and protein hormones. Pancreatic hormones- functions in membrane transport, protein synthesis, growth and metabolism. Neuroendocrine regulation of hunger and satiety (Hypothalamus, Leptin, Ghrelin). Gastro-intestinal hormones-Site of origin, chemical nature and mode of action.
- 3. Nerve-muscle physiology:** Elementary idea of nerve impulse propagation, action potential transmission through synapse and NM junction, different nutrients causing excitation and inhibition in neuromuscular physiology.

## **Group B**

- 4. Alimentation:** Mechanism of HCl secretion- physiological, nutritional and pharmacological aspects. Bile formation and secretion; Anatomy of liver and entero-hepatic circulation. Role of mucosa associated lymphocytes in health and disease.
- 5. Blood :** Plasma protein, Properties and origin of Plasma Protein, relation of diet to plasma protein. Erythropoiesis, Regulation of erythropoiesis, Fate of Red Blood Corpuscles (RBC). Mechanism of haemoglobin synthesis, factors controlling haemoglobin synthesis, Varieties of Haemoglobin, Role of B12 & folic acid in haemoglobin synthesis.

## **Group C**

- 6. Homeostasis:** Role of kidney in maintaining electrolyte balance. Buffer system of body (lung, kidney and blood). Role of circulation (Systemic, Splanchnic, cerebral and coronary) in distribution of nutrients and excreta.
- 7. Nervous system:** Organization of Nervous system: Structural & Fractional anatomy of nervous system. Elementary feature of the anatomy of the central & peripheral nervous system (cerebral cortex, cerebellum, Thalamus, hypothalamus, spinal cord).

### **PAPER-1.4 Advanced Nutrition I Credit: 4**

60 Hrs

50 marks

## **Group A**

- 1. The nutritional role of macro- nutrients:-** Requirements, sources, functions, deficiency and excesses of the different nutrients –carbohydrate, protein, fat. Their general properties, estimation by colour reaction, Different method of estimation of the nutrients. Estimation of protein quality.

2. **Dietary modification in extreme conditions:** Flood, Famine, Draught, alteration in temperature and altitude.

### **Group B**

3. **The nutritional role of micronutrients** :Requirements, sources, functions, assessment, deficiency and excesses of the different nutrients –vitamin (Vitamin A,D,E,K, Thiamine, Riboflavin, Niacin, Pantothenic acid, Pyridoxine Folic Acid, , Cyanocobalamin, Lipoic acid, Biotin), and mineral (Na,K, Cl, Ca, P, Mg Fe, I, Cu, Zn, Mn, Se, F).
4. **Metabolic interrelationship:-** Metabolic interrelationship between nutrients- Vitamin-Vitamin, Vitamin-Minerals & Minerals- Minerals.

### **Group C**

5. **Recommended dietary allowances:-** Basis for computing nutrient requirements - latest concepts in dietary recommendations,: their uses and limitations.RDA of different age groups (2010)-Requirements & RDA, references men and women. Determination of RDA of different nutrients. Methods of deriving RDA.
6. **Energy:** ACU, REE, energy balance, calculation of energy requirements by factorial method, BMR, direct and indirect calorimetric, SDA.

## **PAPER – 1.5 Applied Physiology Practical Credit Point 4**

Total Marks 50

Total Hours 60

- 1.Estimation of haemoglobin using kit.
- 2.Determination of haematocrit value.Packed cell volume, RBC and WBC count.
- 3.Determination of blood pressure , pulse rate . heart rate before and after Harvard step test.

4. Demonstration of tissue preparation (fixation, embedding, mounting etc )
5. Immunoelectrophoresis. (using kit)
6. Quantitative estimation of sugar (fasting blood sugar)
7. Quantitative estimation of Na<sup>+</sup>/K<sup>+</sup>, HDL, Cholesterol.

**PAPER -1.6 FOOD CHEMISTRY PRACTICAL Credit Point 4**

Total Marks 50

Total Hours 60

Group A

1. Identification of Protein.
2. Identification of Fat.
3. Identification of Amino Acids.

Group B

1. Quantitative estimation of carbohydrate in foods.
2. Quantitative estimation of Protein in food.
3. Quantitative estimation of amino acid.
4. Analysis of Proximate constituent like crude fibre, crude protein etc.
5. Measurement of pH, acidity and moisture content, ash content etc.
6. Analysis of some food products.
7. Chromatographic separation techniques.